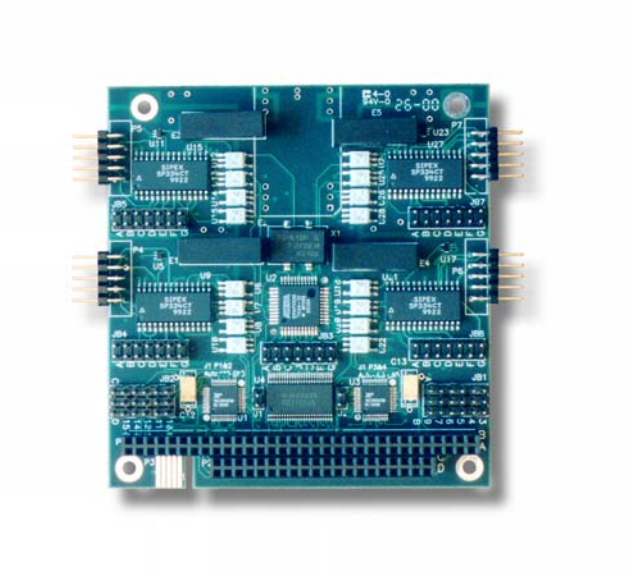
Connect Tech Inc.
Industrial Strength Communications



Xtreme/104 Opto

PC/104 Serial Communications Adapter

User Manual

Connect Tech Inc
42 Arrow Road
Guelph, Ontario
N1K 1S6
Tel: 519-836-1291
Toll: 800-426-8979 (North America only)
Fax: 519-836-4878
Email: sales@connecttech.com
support@connecttech.com
URL: www.connecttech.com

CTIM-00007, Revision 0.05, June 2005

Limited Lifetime Warranty

Connect Tech Inc. provides a Lifetime Warranty for all Connect Tech Inc. products. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. Lifetime Warranty is defined as the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract Life Time Warranty if no replacement is available.

The above warranty is the only warranty authorized by Connect Tech Inc. Under no circumstances will Connect Tech Inc. be liable in any way for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, such product.

Copyright Notice

The information contained in this document is subject to change without notice. Connect Tech Inc. shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material. This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent of Connect Tech, Inc.

Copyright © 2000 - 2005 by Connect Tech, Inc.

Trademark Acknowledgment

Connect Tech, Inc. acknowledges all trademarks, registered trademarks and/or copyrights referred to in this document as the property of their respective owners.

Not listing all possible trademarks or copyright acknowledgments does not constitute a lack of acknowledgment to the rightful owners of the trademarks and copyrights mentioned in this document.

Certification

Xtreme/104 Opto

The Xtreme/104 Opto product family is to be included into a device ultimately subject to FCC, DOC/IC, and CE certification. The customer is responsible for bringing the completed device into compliance prior to resale.

Connect Tech has designed the Xtreme/104 Opto with EMI and EMC considerations such as:

- Ground and power planes
- Controlled slew-rate signals
- EMI/EMC reducing PCB layout

Table of Contents

Limited Lifetime Warranty 2
Copyright Notice 2
Trademark Acknowledgment 2
Certification 3
Xtreme/104 Opto 3
Table of Contents 4
Customer Support Overview 6
Contact Information 6
Introduction 7
Features 7
Optical Isolation Notes 7
Xtreme/104 Opto Components 8
Hardware Installation 9
Installing the Xtreme/104 Opto into your system 9
Hardware Configuration 9
Port Addresses 9
Status Port 9
Custom Port Addresses 10
Interrupt Selection 10
Mode 1 (one IRQ): 11
Mode 2 (two IRQs): 11
Mode 3 (two IRQs – Xtreme/104 Opto, 4 port model only): 11
Mode 4 (four IRQs – Xtreme/104 Opto, 4 port model only): 11
Baud Rate Selection 13
Software Installation 14
Specifications 15
Operating Environment 15
Power Requirements 15
PC Bus Interface 15
UARTs 15
RS-232 15
RS-422/485 15
Control Signals 15
Optical Isolation 15
Dimensions 15
Connectors/Interface 15
Connectors/Pinouts 16
Factory Default Settings 17
RS-232/RS-422/485 Interfaces 18
Electrical Interface Selection 18
Full Duplex Mode 19
Half Duplex RS-422/485 19
Multi-drop 4-wire Mode 20
Line Termination 21
RS-422/485 Cable Wiring Examples 23

List of Tables

Table 1: Port address settings 10
Table 2: Baud rates 13
Table 3: P4/P5/P6/P7 - 10 pin port header pinouts 16
Table 4: DB-9 cable connector pinouts 17

List of Figures

Figure 1: Xtreme/104 Opto, 2 port model 8
Figure 2: Xtreme/104 Opto, 4 port model 8
Figure 3: Port address selection jumper setting examples 10
Figure 4: Interrupt (IRQ) selection jumper setting examples 12
Figure 5: Baud rate selection jumper setting example 13
Figure 6: Electrical interface jumper settings example 18
Figure 7: Full duplex mode jumper setting example 19
Figure 8: Half duplex mode jumper setting example 20
Figure 9: Multi-drop 4-wire mode jumper setting 20
Figure 10: RS-422/485 partial schematic Xtreme/104 Opto 21
Figure 11: Line bias and termination jumper setting example 22
Figure 12: RS-422/485 wiring diagram (4 wire) 23
Figure 13: RS-422/485 wiring diagram (2 wire) 23

Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Our support section is available 24 hours a day, 7 days a week on our website at: www.connecttech.com/sub/support/support.asp. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

We offer three ways for you to contact us:

Mail/Courier
You may contact us by letter at:
Connect Tech Inc.
Technical Support
42 Arrow Road
Guelph, Ontario
Canada N1K 1S6

Email/Internet
You may contact us through the Internet. Our email and URL addresses on the Internet are:

sales@connecttech.com
support@connecttech.com
www.connecttech.com

> **Note:**
> Please go to the Download Zone or the Knowledge Database in the Support Center on the Connect Tech website for product manuals, installation guides, device driver software and technical tips.
> Submit your technical support questions to our customer support engineers via the Support Center on the Connect Tech website.

Telephone/Facsimile
Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Telephone: 800-426-8979 (North America only)
Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST, Monday to Friday)
Facsimile: 519-836-4878 (on-line 24 hours)

Introduction

Xtreme/104 Opto adapters are high performance multi-port serial adapters for PC/104 stacks that enable you to connect up to four serial devices per board. Each port is optically isolated from each other and from the board up to 3.0 kV AC, peak to peak.

Features

- Two or four asynchronous serial ports
- RS-232 and/or RS-422/485 electrical interfaces
- Interfaces are jumper selectable for each port
- Optical isolation (see below for more details)
- Industrial temperature model operates between -40 and 85 degrees Celsius (-40 to 185 degrees Fahrenheit)
- Multiple Xtreme/104 Opto adapters may reside in a system
- 16C2850 dual UARTs control each port. The 16C2850 has 128 byte transmit and receive FIFO buffers for each port and automatic software/hardware flow control
- Each port has independent baud rate selection offering baud rates from 50 bps – 230.4 Kbps (RS-232) and 50 bps – 460.8 Kbps (RS-422/485), with 5, 6, 7 or 8 data bits and 1, 1.5, 2 stop bits, odd or even parity
- On board jumpers allow the selection of 8 predefined I/O address sets
- On board jumpers allow the selection of 1, 2 or 4 IRQ lines. Choose from interrupts 3, 4, 5, 6, 7, 9, 10, 11, 12, 14 and 15
- Each port is individually optically isolated up to 3.0 kV AC peak to peak
- Driver support for Windows 95/98/Me, Windows CE/CE .NET, Windows XP and Windows NT/2000, Linux, Solaris, SCO Unix, and QNX 2, 4, and QNX 6 (Neutrino)

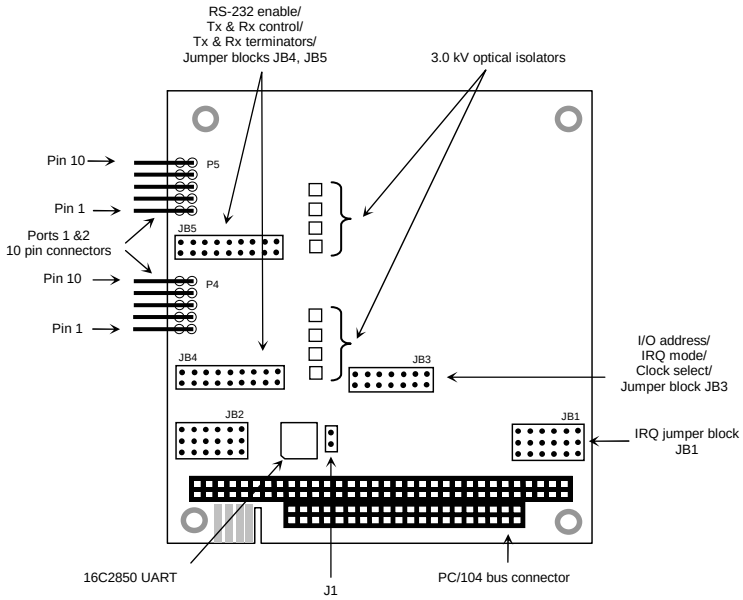
Optical Isolation Notes

The Xtreme/104 Opto uses optocouplers and isolated DC to DC converters to achieve optical isolation. The board provides **3.0 kV AC** peak to peak isolation between each port and also between each port and your system. However there are some considerations to note.

- Optical isolation can degrade if the board is subjected to high humidity, especially conditions that are right for condensation to occur.
- Optical isolation can degrade if airborne dust is allowed to accumulate on the surface of the board.
- **An electrical shock hazard could exist** depending on what equipment is connected to the Xtreme/104 Opto**.** Under these circumstances the wiring and/or cabling leading to the serial port connections may have high voltages on them. You must use appropriately insulated cables in these situations.
- Please contact your Connect Tech Technical Support Specialist for any questions related to the application of optical isolation.

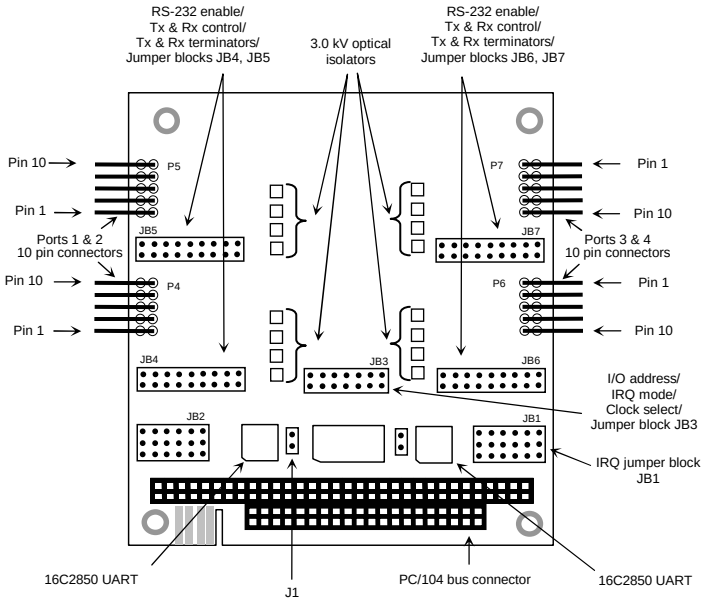
Xtreme/104 Opto Components

Figure 1: Xtreme/104 Opto, 2 port model



Note: Rev A & B Xtreme/104 Opto adapters do not have positions H & I on jumper blocks, JB4, JB5, JB6, and JB7

Figure 2: Xtreme/104 Opto, 4 port model



Note: Rev A & B Xtreme/104 Opto adapters do not have positions H & I on jumper blocks, JB4, JB5, JB6, and JB7

Hardware Installation

Installing the Xtreme/104 Opto into your system

Before you begin, take a minute to ensure that your package includes the required components that should have shipped with your Xtreme/104 Opto.

- One Xtreme/104 Opto board
- One CD containing software and documentation
- One DB-9 cable (optional)

If any of these components is missing, contact Connect Tech (See Contact Details) or your reseller.

For ease of installation, be sure you have configured all jumpers prior to adding the Xtreme/104 Opto to your PC/104 stack (See Hardware Configuration section).

Hardware Configuration

Port Addresses

Port addresses are configured with the jumper block JB3 on the Xtreme/104 Opto adapter. Jumpers A, B, and C select a set of port addresses for the ports.

Status Port

Some operating system device drivers can utilize an Interrupt Status Port. Windows NT, for example, offers it as an option and it is mandatory for SCO Unix. This can improve your system's efficiency. The Xtreme/104 Opto offers a status port and this port is enabled and disabled using jumper F on jumper block JB3.

Please refer to Table 1 for a list of supported status port addresses and to Figure 1 and Figure 2 for a description and location of jumper block JB3.

Technical Tip:
Please make certain the Status Port Enable jumper is disabled if your application does not use the Status Port. This eliminates the possibility of an address conflict with another device in your system.

Custom Port Addresses

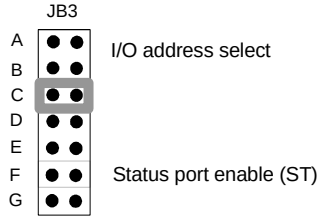
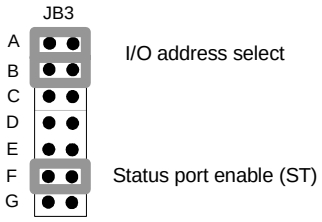
You can generate other port addresses by making changes to the CPLDs found on the Xtreme/104 Opto adapter. If you require specific port addresses not listed in Table 1 please contact a Connect Tech Customer Service Representative for further information.

Table 1: Port address settings

Jumper			Ports				
A	**B**	**C**	**1**	**2**	**3**	**4**	**Status**
on	on	on	150	158	160	168	190
off	on	on	250	258	260	268	290
on	off	on	1A0	1A8	1B0	1B8	1E0
off	off	on	2A0	2A8	2B0	2B8	2E0
on	on	off	100	108	110	118	140
off	on	off	200	208	210	218	240
on	off	off	380	388	390	398	3C0
off	off	off	300	308	310	318	340

Note:
Addresses for ports 3 and 4 do not apply to the Xtreme/104 Opto two port models.
Port addresses are expressed in hex.

Figure 3: Port address selection jumper setting examples

Example 1	***Example 2***
In the following example, the port address jumper block is set for port addresses 2A0, 2A8, 2B0, 2B8 (hex) and status port disabled.	*In the following example, the port address jumper block is set for port addresses 100, 108, 110, 118 (hex) and status port 140 (hex) enabled.*
	

Interrupt Selection

You can configure an interrupt request line (IRQ) with the jumper blocks JB1, JB2 and JB3 on the Xtreme/104 Opto adapter. Please refer to Figure 1 and Figure 2 for a description and location of the jumper blocks JB1, JB2 and JB3.

You are able to configure the Xtreme/104 Opto adapter for four different IRQ modes.

Mode 1 (one IRQ):

1. Ensure there are no jumpers across positions E and D on the JB3 jumper block.
2. All ports interrupt on one IRQ by setting jumpers on the A or C rows and the middle rows of jumper blocks JB1 or JB2.

Mode 2 (two IRQs):

1. Jumper position D on the JB3 jumper block.
2. The odd ports (ports 1, 3) interrupt on one IRQ by setting jumpers on the B or D rows and the middle rows of jumper blocks JB1 or JB2.
3. The even ports (ports 2, 4) interrupt on one IRQ by setting jumpers on the A or C rows and the middle rows of jumper blocks JB1 or JB2.

Mode 3 (two IRQs – Xtreme/104 Opto, 4 port model only):

1. Jumper position E on the JB3 jumper block.
2. The first two ports (ports 1, 2) interrupt on one IRQ by setting jumpers on the A or C rows and the middle rows of jumper blocks JB1 and JB2.
3. The last two ports (ports 3, 4) interrupt on one IRQ by setting jumpers on the B or D rows and the middle rows of jumper blocks JB1 and JB2.

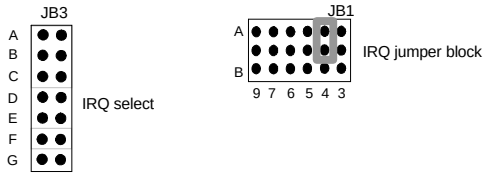
Mode 4 (four IRQs – Xtreme/104 Opto, 4 port model only):

1. Jumper positions D and E on the JB3 jumper block.
2. To set an IRQ for Port 1 install a jumper across a pair of pins on A row and the middle row of IRQ block JB1.
3. To set an IRQ for Port 2 install a jumper across a pair of pins on B row and the middle row of IRQ block JB1.
4. To set an IRQ for Port 3 install a jumper across a pair of pins on C row and the middle row of IRQ block JB2.
5. To set an IRQ for Port 4 install a jumper across a pair of pins on D row and the middle row of IRQ block JB2.

Figure 4: Interrupt (IRQ) selection jumper setting examples

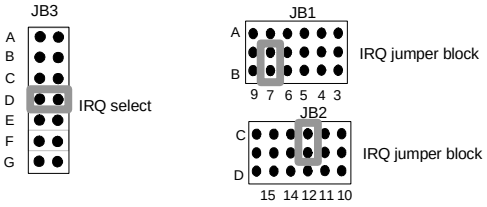
Example: Mode 1 – one IRQ

In the following example, the jumper blocks are set so all ports interrupt on IRQ 4.



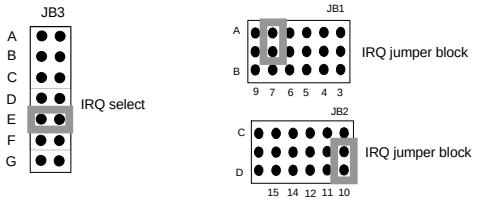
Example: Mode 2 – two IRQs

In the following example, Ports 1 and 3 are set to interrupt on IRQ 7. Ports 2 and 4 interrupt on IRQ 12.



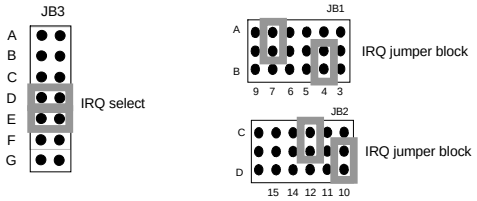
Example: Mode 3 – two IRQs (Xtreme/104 Opto, 4 port model only)

In the following example, Ports 1 and 2 are set to interrupt on IRQ 7 and Ports 3 and 4 interrupt on IRQ 10.



Example: Mode 4 – four IRQs (Xtreme/104 Opto, 4 port model only)

In the following example, Port 1 is set to interrupt on IRQ 7. Port 2 interrupts on IRQ 4. Port 3 interrupts on IRQ 12. Port 4 interrupts on IRQ 10.



Baud Rate Selection

The Xtreme/104 Opto is capable of baud rates up to 460.8 kbps (4X oscillator) or 115.2 kbps (1X oscillator) depending on whether a shorting block is installed across position G on the JB3 jumper block. Please refer to Figure 1 and Figure 2 for a description and location of the jumper block JB3. Please refer to Table 2 for a list of standard and extended baud rates for the Xtreme/104 Opto.

Figure 5: Baud rate selection jumper setting example

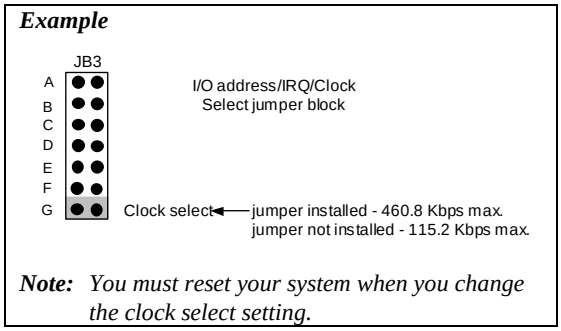


Table 2: Baud rates

Standard Baud Rate. (1X - set in software)	**Max. Baud Rate (4X standard)**
50	200
75	300
150	600
300	1200
600	2400
1200	4800
2400	9600
4800	19.2K
7200	28.8K
9600	38.4K
19.2K	76.8K
38.4K	153.6K
57.6K	230.4K
115.2K	460.8K

Software Installation

Xtreme/104 Opto adapters are standard multi-port serial adapters that utilize 16C2850 UARTs. In many cases, users have software that will interface directly to the Xtreme/104 Opto adapters. Many operating systems come with handlers to control access to multiple 8250 style UARTs. Xtreme/104 Opto adapters currently have device drivers for the following operating systems:

- DOS
- Linux
- QNX 2
- QNX 4
- QNX 6
- SCO Unix/Openserver
- Solaris
- Windows 2000
- Windows 95/98/Me
- Windows CE
- Windows CE .NET
- Windows NT
- Windows XP
- VxWorks

If you require further information please contact Connect Tech Customer Support.

Note:
The CD that ships with your Xtreme/104 Opto adapter may include howto.txt or readme.txt files. Please examine these files for technical tips or release notes concerning installation and configuration of various device drivers and software utilities. If you did not receive a CD containing the driver for your operating system or you require additional information, please go to the Download Zone of the Support Center on the Connect Tech website for product manuals, installation guides, diagnostic utilities and the most recent device driver software.

Specifications

Operating Environment

- Storage temperature: -65° C to 150° C
- Operating temperature:
  0° C to 70° C (standard version)
  -40° C to 85° C (extended temperature version)
- Humidity: 0 to 90% relative humidity, non-condensing

Power Requirements

Xtreme/104 Opto (2 & 4 port models)

- +5 VDC +/-5% @ 260 mA (typical)

PC Bus Interface

- PC interrupts are jumper selectable, (3, 4, 5, 6, 7, 9, 10, 11, 12, 14, and 15)
- Base address for UARTs is jumper selectable. Each UART requires 8 I/O addresses
- One PC/104 16-bit expansion connector

UARTs

- 16C2850 dual UARTs communication controllers
- On chip 128 byte TxD and RxD FIFO buffers per port
- Automatic RTS/CTS (Hardware) flow control
- Automatic XON/XOFF (Software) flow control
- Compatible with 16550 style software drivers

RS-232

- Programmable baud rate generator - up to 230.4K baud on all RS-232 ports
- Full duplex, point to point

RS-422/485

- Programmable baud rate generator - up to 460.8K baud on all RS-422/485 ports
- Full duplex, point to point or multi-drop
- Half duplex, point to point or multi-drop
- Jumper selectable RxD, TxD, RTS, and CTS line/bias termination resistors
- Compatible with RS-422

Control Signals

- RS-232 TxD; RxD; RTS; CTS
- RS-422/485 RTS ±; TxD ±; CTS ±; RxD ±

Optical Isolation

Xtreme/104 Opto

- 3.0 kV AC peak to peak on every signal of every port.

Dimensions

Xtreme/104 Opto PCB

- Length: 10.40 cm (4.09 inches) – includes connectors
- Height: 1.10 cm (0.43 inches)
- Width: 9.60 cm (3.78 inches)
- Compliant to PC/104 Specification 2.3

Connectors/Interface

Xtreme/104 Opto (2 port model)

- Two 10 pin header connectors

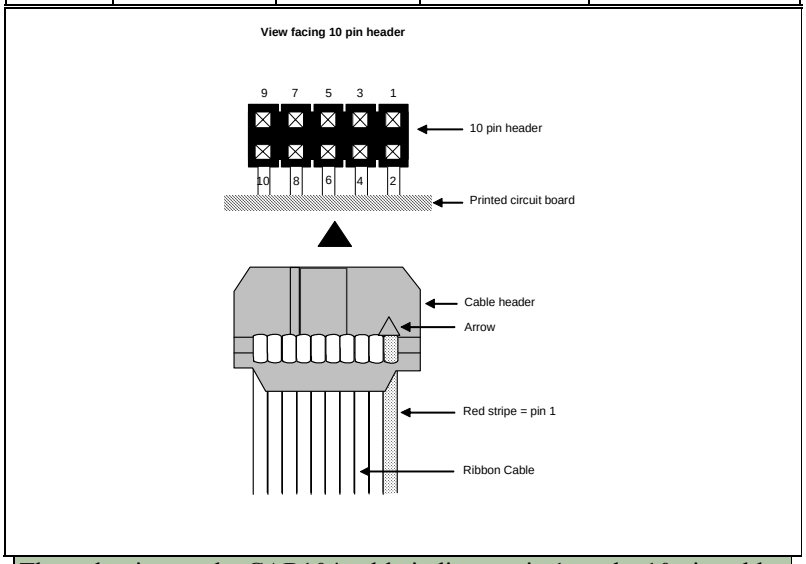
Xtreme/104 Opto (4 port model)

- Four 10 pin header connectors

Connectors/Pinouts

Table 3: P4/P5/P6/P7 - 10 pin port header pinouts

Pin No.	RS-232	Direction	Direction	Direction
1	NC	NC	RxD (+)	input
2	NC	NC	CTS (-)	input
3	RxD	input	RxD (-)	input
4	RTS	output	RTS (+)	output
5	TxD	output	TxD (+)	output
6	CTS	input	CTS (+)	input
7	NC	NC	TxD (-)	output
8	NC	NC	RTS (-)	output
9	isolated gnd.	signal gnd.	isolated gnd.	signal reference
10	N/A	N/A	N/A	N/A

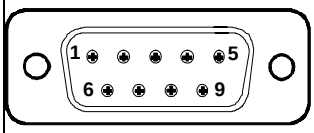


The red stripe on the CAB104 cable indicates pin 1 on the 10 pin cable header connector.

Table 4: DB-9 cable connector pinouts

Pin No.	RS-232 Signal	Direction	RS-422/485 Signal	Direction
1	NC	NC	RxD (+)	input
2	RxD	input	RxD (-)	input
3	TxD	output	TxD (+)	output
4	NC	NC	TxD (-)	output
5	Isolated Gnd	signal gnd	Isolated Gnd	signal reference
6	NC	NC	CTS (-)	input
7	RTS	output	RTS (+)	output
8	CTS	input	CTS (+)	input
9	NC	NC	RTS (-)	output

Male DB-9 Connector



Part Number: CAB104

You must connect pin 5 (the isolated ground) to the ground of the connected external device.

The red stripe on the CAB104 cable indicates pin 1 on the 10 pin header connector.

Ensure that you terminate the CTS signal if not required by your application. This is commonly done by connecting CTS to RTS. Failure to do so may result in a loss of a performance on your Xtreme/104 Opto adapter.

Factory Default Settings

Function	Factory Setting
I/O Port Address	JB3 is set for I/O port addresses 300, 308, 310, 318 hex and the status port disabled (positions A, B, C, not jumpered).
Status Port Address	JB3 is set for the status port disabled (position F not jumpered).
Baud Rate	JB3 is set for the maximum baud rate of 115.2 Kbps (position G not jumpered).
IRQs	1. JB3 set for all ports interrupting on a single interrupt (positions D & E not jumpered). 2. JB1 and JB2 jumper blocks set for no interrupts (all positions not jumpered).
Electrical Interface	JB4, JB5, JB6 and JB7 set for all ports RS-422/485 (position B not jumpered).
RS-422/485 Mode	1. JB4, JB5, JB6 and JB7 set for all ports running in full duplex mode (positions A and C not jumpered). 2. J1 and J2 are not jumpered.
Termination	JB4, JB5, JB6 and JB7 set for all ports being not terminated (positions D, E, F, G, H, and I, not jumpered).

See Figure 1 and Figure 2 for the locations of these jumper blocks.
Revisions A and B of the Xtreme/104 Opto adapter do not have bias resistors
Revisions A & B of the Xtreme/104 Opto adapter do not have positions H & I on jumper blocks, JB4, JB5, JB6, and JB7

RS-232/RS-422/485 Interfaces

Electrical Interface Selection

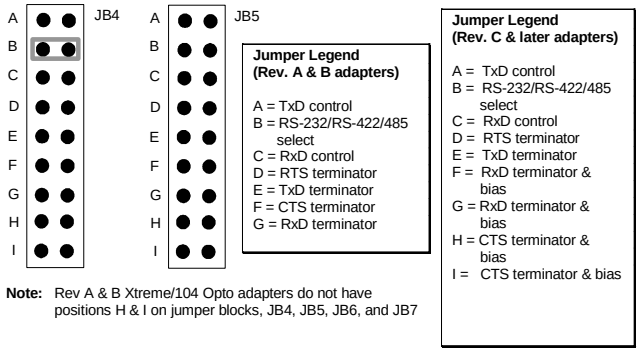
The Xtreme/104 Opto adapter provides jumper selectable RS-232 and RS-422/485 electrical interfaces on each port**.**

Jumper blocks JB4, JB5, JB6 and JB7 set the electrical interfaces for the individual ports 1, 2, 3 and 4 respectively. To set a port to the RS-232 interface, install a jumper across the B position of the corresponding jumper block. If no jumper is installed, the port will default to the RS-422/485 interface**.** Figure 1 and Figure 2 show the locations of jumper blocks JB4, JB5, JB6 and JB7.

Figure 6: Electrical interface jumper settings example

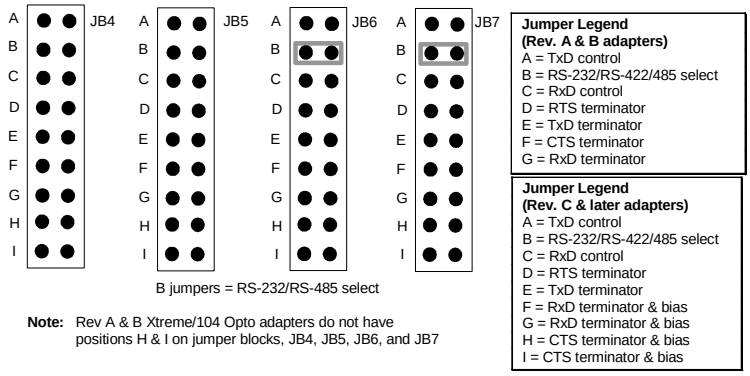
Example 1

In this example, Port 1 (JB4) is set for RS-232 and Port 2 (JB5) is set for RS-422/485.



Example 2

In this example, Ports 1 and 2 (JB4, JB5) are set for RS-422/485 and Ports 3, 4 (JB6, JB7) are set for RS-232.



You can set up the RS-232 serial ports to run at up to 230.4 Kbps, but you must use good quality serial cables with lengths that do not exceed 2 metres.

Full Duplex Mode

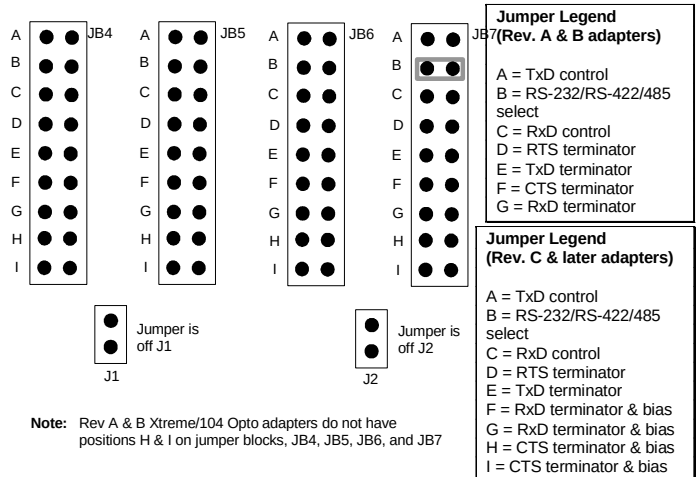
If you wish to run the individual RS-422/485 ports in full duplex mode, do not install jumpers across positions A and C of jumper blocks JB4, JB5, JB6 and JB7. In this mode, transmit and receive are active all the time. This mode is typically used in point-to-point situations much like RS-232.

See Figure 1 and Figure 2 for the locations of jumper blocks on your model.

Figure 7: Full duplex mode jumper setting example

Example

The example below shows the settings on JB4, JB5, JB6, and J1, J2 where RS-422/485 ports 1, 2 and 3 are set for full duplex mode. Port 4 is RS-232 and therefore is not set for full duplex.



Technical Tip:

J1 controls ports 1 and 2 and J2 controls ports 3 and 4. If both ports 1 and 2 are set for full duplex then J1 should not be jumpered. If both ports 3 and 4 are set for full duplex then J2 should not be jumpered.

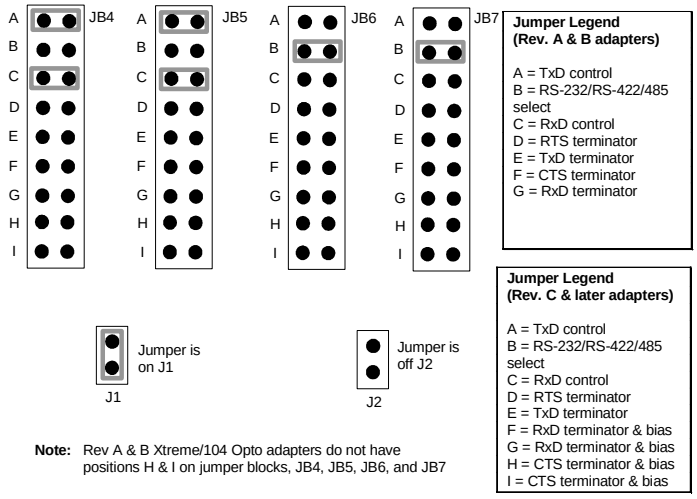
Half Duplex RS-422/485

Place jumpers on positions A and C of jumper blocks JB4, JB5, JB6 and JB7 to run the individual RS-422/485 ports in half duplex mode. In this mode your Xtreme/104 Opto adapter controls the transmitter and receiver circuits. RTS is turned on prior to and during transmission to cause the transmit driver to enable and the receiver to disable. RTS is turned off when not transmitting to cause the transmit driver to disable (tri-stated) and the receiver to enable. The Xtreme/104 Opto adapter is responsible for timing the RTS toggle.

See Figure 1 and Figure 2 for jumper block locations.

Figure 8: Half duplex mode jumper setting example

In the following example, Ports 1 and 2 are set for half duplex mode. Ports 3 and 4 are RS-232 and therefore should not be set for half duplex.



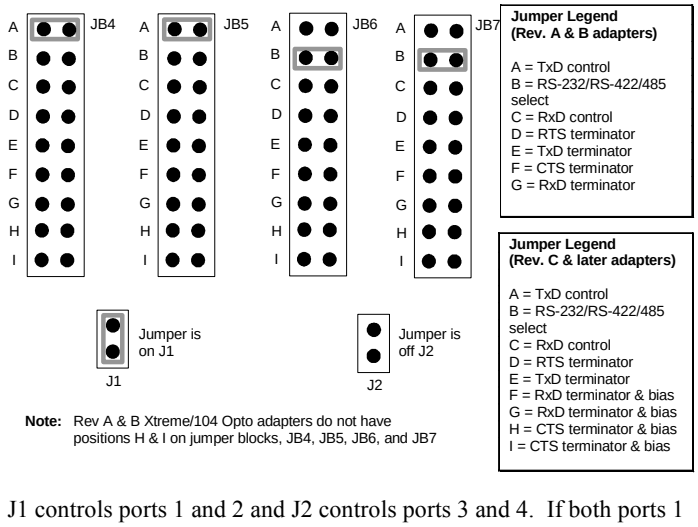
J1 controls ports 1 and 2 and J2 controls ports 3 and 4. If both ports 1 and 2 are set for full duplex then J1 should not be jumpered. If both ports 3 and 4 are set for full duplex then J2 should not be jumpered.

Multi-drop 4-wire Mode

Place a jumper on position A of jumper blocks JB4, JB5, JB6, JB7 and on J1 (ports 1 and 2) or J2 (ports3 and 4) to run the individual RS-422/485 ports in multi-drop slave mode. In this mode the TxD line driver is enabled only when data is transmitted and RxD is enabled all the time. This mode is typically used in multi-drop 4 wire connections.
See Figure 1 and Figure 2 for jumper block locations.

Figure 9: Multi-drop 4-wire mode jumper setting

In the following example, Ports 1 and 2 are set for RS-422/485 multi-drop slave mode. Ports 3 and 4 are RS-232 and therefore should not be set for multi-drop slave mode.



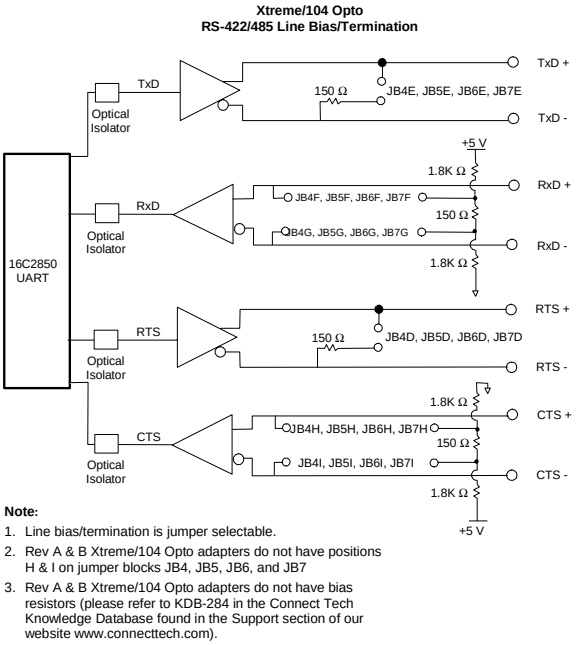
J1 controls ports 1 and 2 and J2 controls ports 3 and 4. If both ports 1 and 2 are set for full duplex then you should not jumper J1. If both ports 3 and 4 are set for full duplex then you should not jumper J2.

Line Termination

Use jumper blocks JB4, JB5, JB6 and JB7 to terminate and bias TxD ±, RxD ±, RTS ±, and CTS ± on the individual RS-422/485 ports through jumper selectable 150 Ohm fixed resistors. Please note that revisions A and B of the Xtreme/104 Opto adapter do not have bias resistors (refer to KDB-284 in the Connect Tech Knowledge Database found in the Support section of our website www.connecttech.com).

See below for a partial schematic of the RS-422/485 circuit for the Xtreme/104 Opto and Figure 1 and Figure 2 for jumper locations for your model.

Figure 10: RS-422/485 partial schematic Xtreme/104 Opto

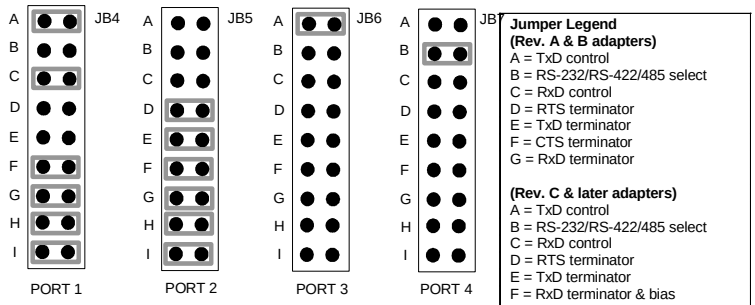


Note:

1. Line bias/termination is jumper selectable.
2. Rev A & B Xtreme/104 Opto adapters do not have positions H & I on jumper blocks JB4, JB5, JB6, and JB7
3. Rev A & B Xtreme/104 Opto adapters do not have bias resistors (please refer to KDB-284 in the Connect Tech Knowledge Database found in the Support section of our website www.connecttech.com).

Figure 11: Line bias and termination jumper setting example

In this example, Port 1 is set for half duplex RS-422/485, terminated and biased on CTS ± and RxD ±.
Port 2 is set for full duplex RS-422/48, bias/termination on RTS ±, TxD ±, CTS ±, and RxD ±.
Port 3 is set for multi-drop slave RS-422/485 and no termination.
Port 4 is set for RS-232 and therefore no termination.



If you want to terminate half duplex RS-422/485 ports, jumper position G (Rev. A & B adapters) or positions F and G (Rev. C adapters and later) on the corresponding jumper block.

To terminate full duplex and multi-drop slave ports, jumper positions D, E, F, G (Rev. A & B adapters) or D, E, F, G, H, and I (Rev. C adapters and later), on the corresponding jumper block.

For RS-232 ports do not jumper positions D, E, F, G, H, and I on the corresponding jumper block.

RS-422/485 Cable Wiring Examples

Figure 12: RS-422/485 wiring diagram (4 wire)

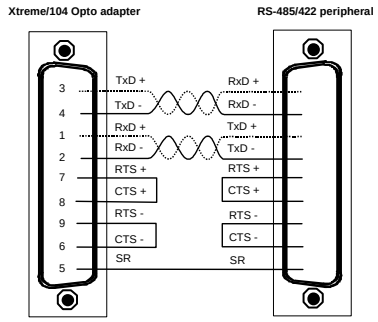
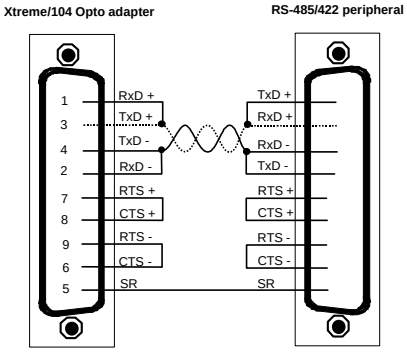


Figure 13: RS-422/485 wiring diagram (2 wire)



Notes:
The RS-422/485 electrical interface consists of a differential signaling scheme. You should always connect the signals with twisted pairs.
Signal reference *must* be connected.